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RESEARCH ARTICLE

ENDOBRONCHIAL TUBERCULOSIS: A CASE BASED APPROACH

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Abstract

Endobronchial tuberculosis is defined as tuberculous infection of the tracheobronchial tree. Although clinical features differ between various types and stages of endobronchial tuberculosis, common symptoms are cough, hemoptysis, sputum production, wheezing, chest pain, fever and dyspnea. Although endobronchial lesions usually result in sputum positivity for acid fast bacilli (AFB), a false negative sputum or absence of radiological lesions may result in delayed diagnosis. On the other hand, sputum positivity with presence of signs on chest radiology may lead to consideration of parenchymal TB as the primary diagnosis and the coexistence of endobronchial lesions may be missed until sequelae of the latter ensue. Bronchoscopy is essential for confirmation of endobronchial TB. This write up aims to summarize various clinico-radiological manifestations of endobronchial tuberculosis which were encountered in 45 years of clinical practice and will help respiratory clinicians in future for early and prompt diagnosis and management of the same.

Introduction:-

Endobronchial tuberculosis is defined as tuberculous infection of the tracheobronchial tree. Although clinical features differ between various types and stages of endobronchial tuberculosis, common symptoms are cough, hemoptysis, sputum production, wheezing, chest pain, fever and dyspnea. Although endobronchial lesions usually result in sputum positivity for acid fast bacilli (AFB), a false negative sputum or absence of radiological lesions may result in delayed diagnosis. On the other hand, sputum positivity with presence of signs on chest radiology may lead to consideration of parenchymal TB as the primary diagnosis and the coexistence of endobronchial lesions may be missed until sequelae of the latter ensue. Bronchoscopy is essential for confirmation of endobronchial TB. [1]

Endobronchial tuberculosis (TB) occurs in about 10–40% of patients with active tuberculosis. More than half the cases of endobronchial TB occur in patients aged less than 35 years old. The common symptoms of endobronchial TB include cough with expectoration, hemoptysis, breathlessness, and wheeze. The occurrence of an irritable barking cough unresponsive to antitussive medication has also been described as a clinical presentation of endobronchial TB. However, this entity remains a diagnostic challenge even in countries with a high prevalence of TB. Despite widely available diagnostic testing, endobronchial TB is a major cause of morbidity as it frequently heals with concentric scarring resulting in bronchostenosis and atelectasis. Sputum examination is the first step towards the diagnosis of endobronchial TB. However, in cases where sputum is negative or chest radiographic findings are equivocal, bronchoscopy and computed tomography are the investigative modalities of choice to detect and plan appropriate treatment. The commonly reported bronchoscopic findings include hypertrophy with luminal

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narrowing, mucosal edema, erosion, ulceration, and cicatricial stenosis with pseudomembrane formation. The write up here elaborates various cases of endobronchial tuberculosis with different clinico-radiological manifestations. [2]

Case 1

This patient, a 30-year-old female, nonsmoker, presented with cough with expectoration, fever, chest pain, and loss of appetite for last 6 months. On general examination, patient was febrile with no other positive findings and also there were no significant peripheral palpable lymph nodes. On respiratory system examination, there was diminished air entry on the right infrascapular area. Examination of abdomen was within normal limit. Chest X-ray (CXR)posteroanterior (PA) view showed obstructive pneumonitis in right middle and lower zone (**Fig. 1.1**). Contrast enhanced computed tomography (CECT) thorax showed multiple mediastinal lymph nodes with evidence of caseation (**Figs. 1.2A** and **B**) with consolidation in right lower lobe (**Fig. 1.3**). Fiberoptic bronchoscopy showed two nodular growths one small and one large nodule in bronchus intermedius (**Figs. 1.4** and 1.**5**). Mucous membrane around nodules was hyperemic. Transbronchial needle aspiration was done and caseous material came out which was positive for acid-fast bacilli (**Fig. 1.6**). Patient was started with antitubercular drugs (rifampicin, isoniazid, ethambutol, and pyrazinamide) for 2 months followed by rifampicin, isoniazid for next 4 months and patient responded clinically and radiologically to antitubercular drugs (**Fig. 1.7**).

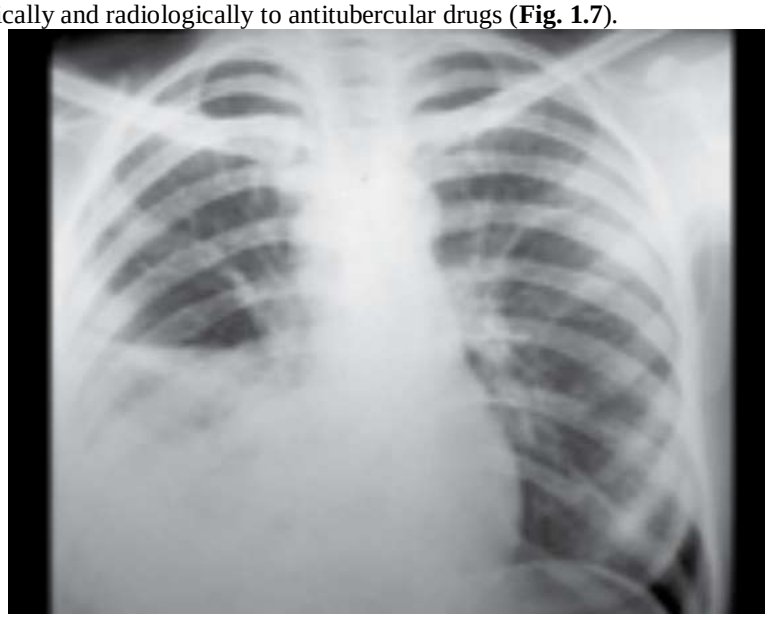
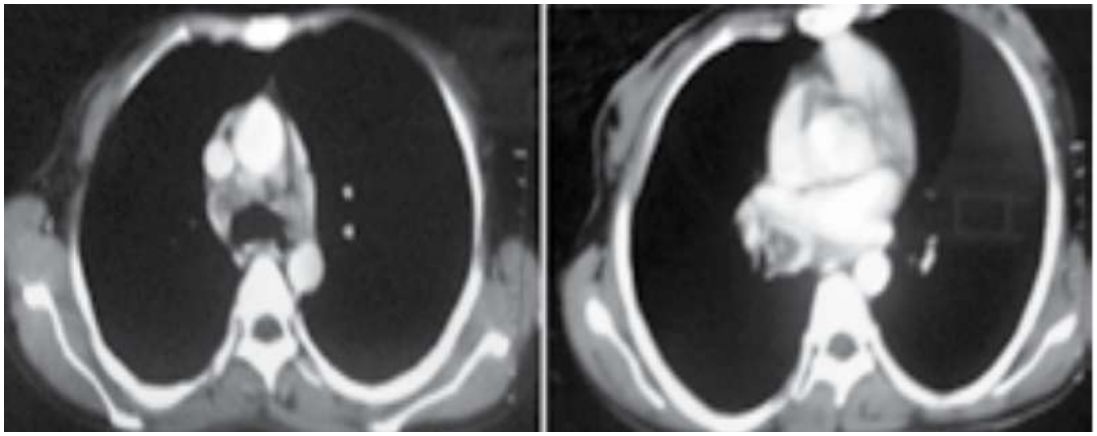


FIG 1.1:- Chest X-Ray PA View Showing obstructive pneumonitis right middle and lower zone.



Figs 1.2 A and B:- CECT thorax showing mediastinal lymphadenitis.

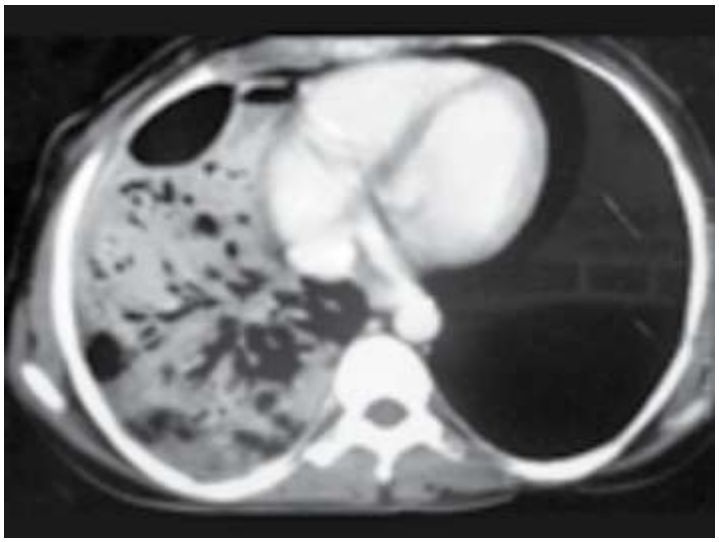


Fig 1.3:- Pneumonitis right lower lobe.

Fig 1.4:- FOB showing two nodular growths.

Fig 1.5:- FOB showing a close view of nodule.

Fig 1.6:- FOB showing caseous material after transbronchial needle aspiration.

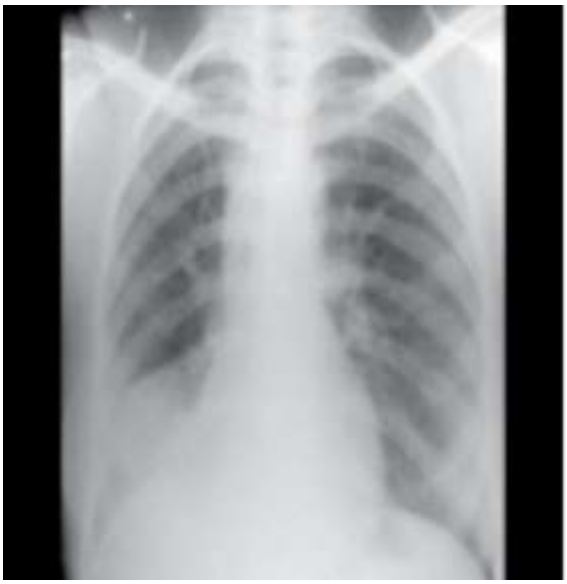


Fig 1.7:- Chest X-Ray PA view showing clearing of shadows after anti-tubercular drugs.

Case 2

This patient, 26-year-old, nonsmoker, known diabetic presented with cough, high fever, and chest painfor last 15 days. On clinical examination, she was febrile. Examination of the respiratory system showed evidence of consolidation. Chest X-ray showed evidence of consolidation in the right upper zone (**Fig. 2.1**). Her sputum was repeatedly negative for acid-fast bacillus. She was prescribed antibiotics for 10 days without any response (**Fig. 2.2**). CECT thorax showed mass lesion with central necrosis (**Fig.2.3**). Fiberoptic bronchoscopy showed edematous and hyperemic tertiary carina near posterior segment of right upper lobe (**Fig. 2.4**). Lumen of the same segment was also reduced. Bronchial aspirate from same segment was positive for acid-fast bacillus. Patient was given oral hypoglycemic drugs and antitubercular treatment to which she responded well clinically as well as radiologically.

Fig 2.1:- CXR Showing pneumonia in the right upper and middle zone.

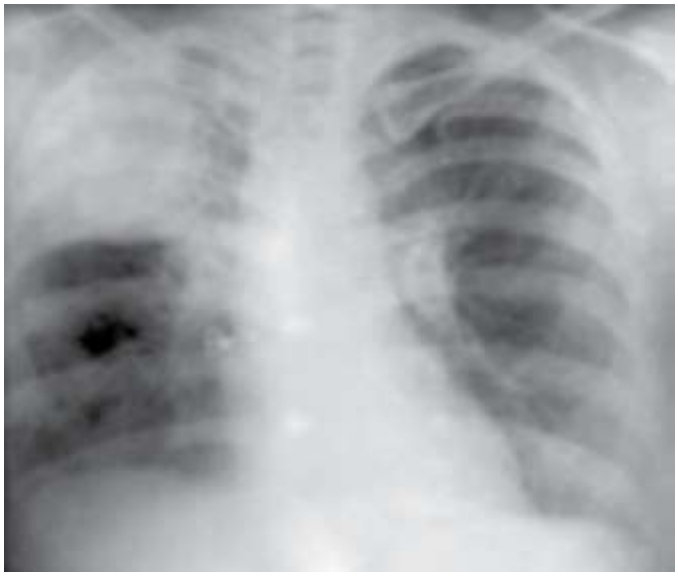


Fig 2.2:- CXR Showing no response after antibiotics.

Fig 2.3:- CECT Thorax showed edematous and hyperemic tertiary carina.

Fig 2.4:- FOB Showed mass like lesion with central necrosis.

Case 3

This patient, 44-year-old female, nonsmoker, presented with cough, and hemoptysis for last 3 months. On general examination, there was no significant finding. Examination of the respiratory system revealed crepitations in the right infraclavicular area. Chest X-ray showed a homogenous shadow in the paratracheal area of the right upper zone (**Figs. 3.1** and 3.**2**). CECT thorax showed triangular opacity with irregular caseation (**Fig. 3.3**). Sputum smear was repeatedly negative for acid-fast bacilli. Fiberoptic bronchoscopy showed edematous and hyperemic secondary carina near right upper lobe bronchus which was filled with necrotic material and blood (**Fig. 3.4**). Bronchial aspirate and brush biopsy was positive for AFB and endobronchial biopsy from right upper lobe was consistent with histology of tuberculosis. She responded clinically and radiologically with antitubercular drugs.

Fig 3.1:- Homogenous radiopaque shadow in right paratracheal area.

Fig 3.2:- Mass like shadow in right upper lobe.

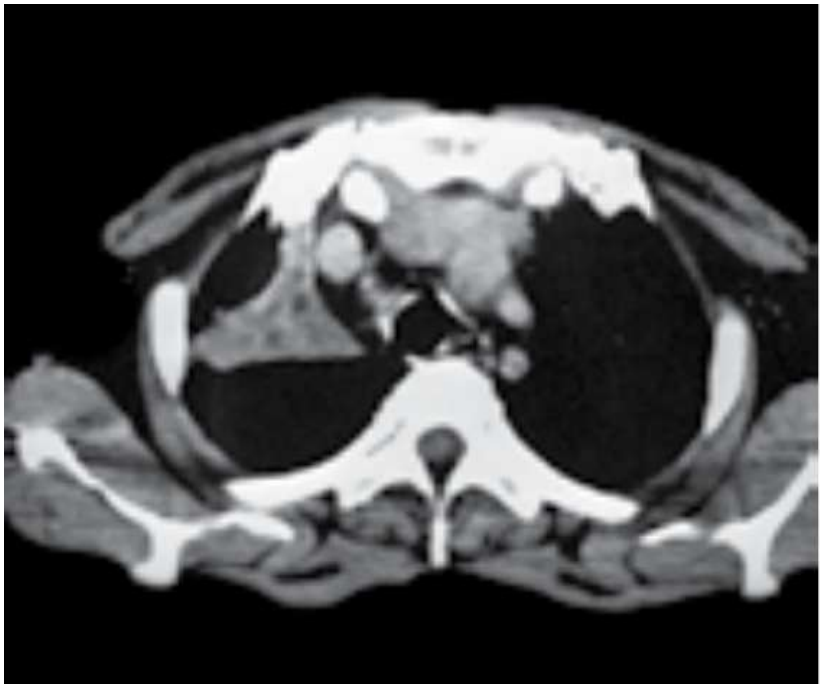


Fig 3.3:- Triangular Opacity with irregular caseation.

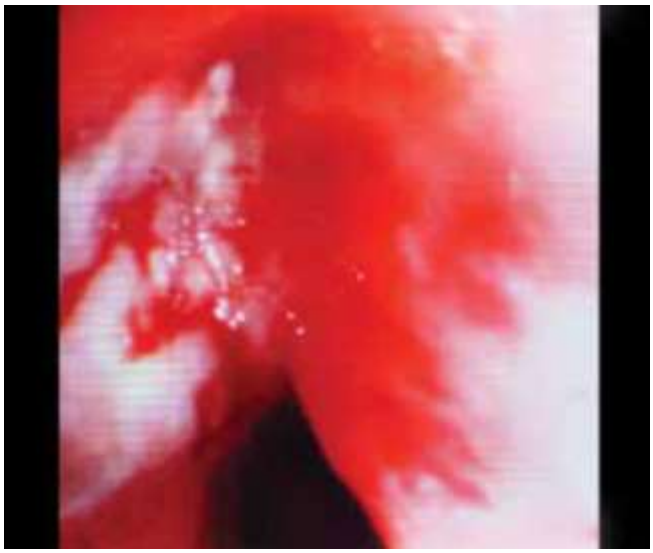


Fig 3.4:- Right upper lobe bronchus obstructed.

Case 4

A 44-year-old male, a beedi smoker 10/day for 20 years presented with cough and recurrenthemoptysis for last 2 months. General and respiratory system examination was withinnormal limits. Chest X-ray was within normal limits (**Fig. 4.1**). CT thorax showed consolidationin left posterior segment (**Fig. 4.2**). Sputum smear was repeatedly negative for acid-fastbacilli. Fiberoptic bronchoscopy (FOB) showed blood clots in left main bronchus. Left lowerlobe bronchial mucous membrane was hyperemic and hypertrophied (**Fig. 4.3**). There was apit-like ulcer in anteromedial wall of left lower lobe bronchus (Pit and basket-like appearance)(**Fig. 4.4**). Bronchial aspirate was positive for acid-fast bacilli. Endobronchial biopsy from pit-likeulcer was consistent with histology of tuberculosis. Patient was treated with antituberculosisdrug. FOB could not be repeated as patient was lost to follow-up.

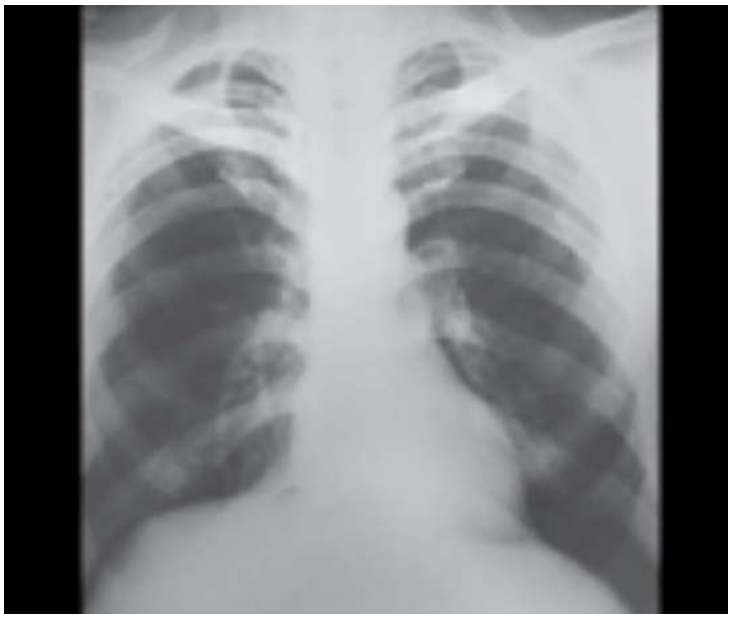


Fig 4.1:- Normal looking X-ray.

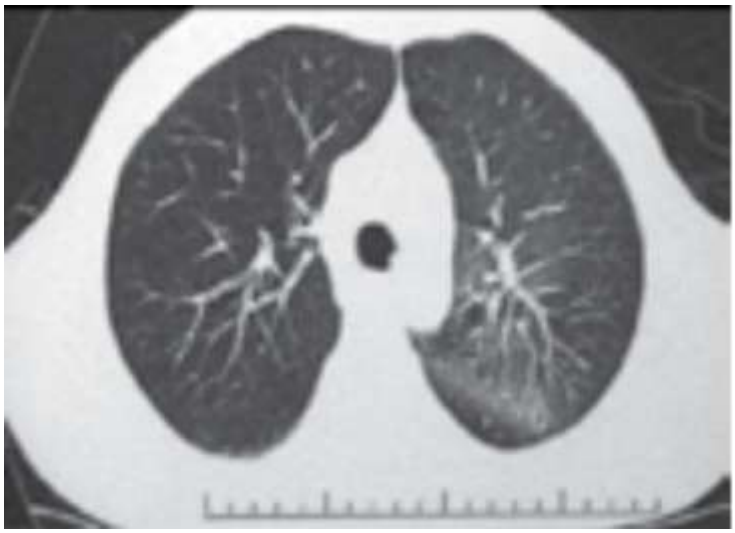


Fig 4.2:- Consolidation in left posterior segment.

Fig 4.3:- Hypertrophied and hyperemic.

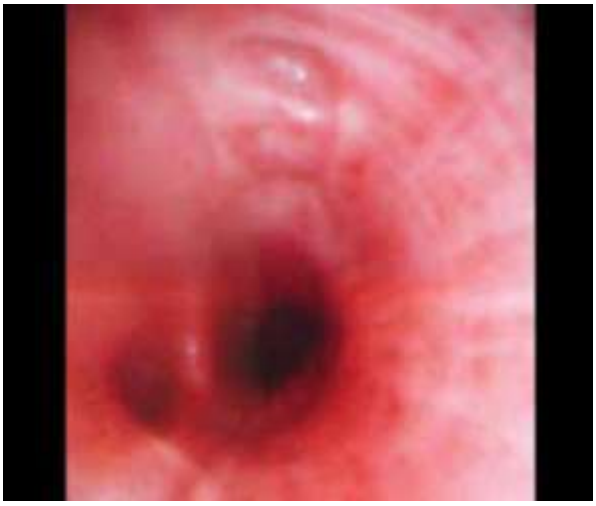
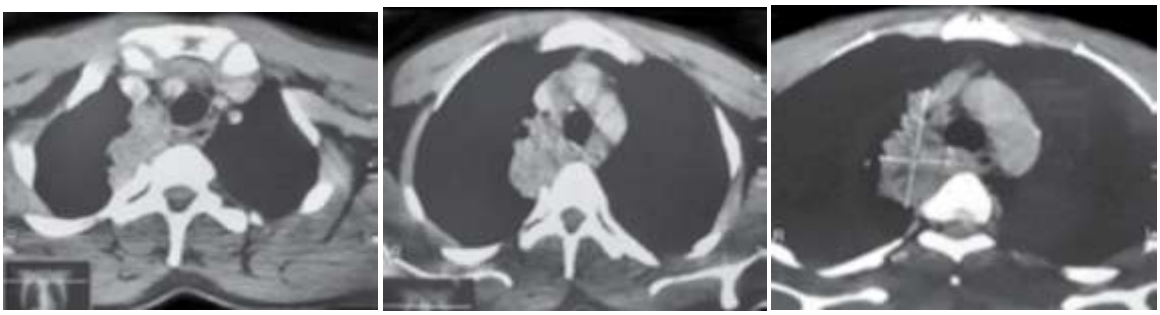


Fig 4.4:- Pit and basket like appearance mucous.

Case 5

A 21-year-old male, nonsmoker presented with fever, dry cough, loss of appetite, and dysphasiafor last 2 months. General physical examination showed pallor. Respiratory examination waswithin normal limits. Chest X-ray posteroanterior (PA) view showed mediastinal widening(**Fig. 5.1**). Computed tomography (CT) thorax showed large heterogeneous mass in rightparatracheal and retrotracheal areas (**Figs. 5.2A** to **C**). Fiberoptic bronchoscopy showed bulgingof posterior wall of lower end of trachea near main carina (**Fig. 5.3**). There were three sinuses withblackish margins and with surrounding hyperemia just behind the secondary carina near theupper lobe bronchus (**Figs. 5.4** and 5.**5**). Endobronchial biopsy from the sinuses showed histologyof tuberculosis (**Fig. 5.6**).

Fig 5.1:- CXR PA View showing mediastinal widening.



Figs 5.2:- A TO C ; CT Thorax showing large heterogenous mass in right paratracheal and retrotracheal areas.

Fig 5.3:- Fiberoptic bronchoscopy showing buldging of posterior wall of lower end of trachea.

Fig 5.4:- Fiberoptic bronchoscopy showing tuberculous sinus.

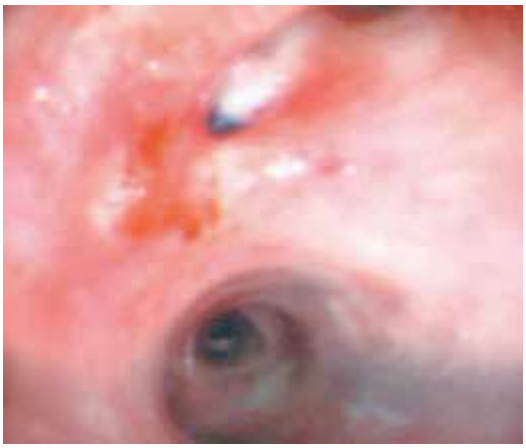


Fig 5.5:- Fiberoptic bronchoscopy showing tuberculous sinus just behind secondary carina.

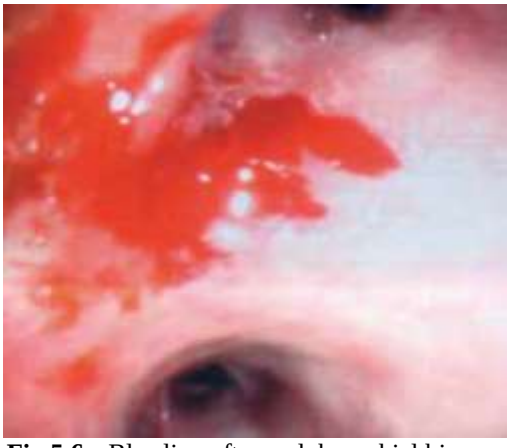


Fig 5.6:- Bleeding after endobronchial biopsy.

Case 6

A 30-year old nonsmoker male and a known case of diabetes mellitus which was not properly controlled for last 6 years, presented with dry cough, fever, breathlessness, and loss of appetite for last 3 months. There was no history of any steroid use or instrumentation in the past. General examination was normal. Chest X-ray had shown no obvious abnormality (Fig. 6.1). CT thorax showed multiple caseating mediastinal lymph nodes (Fig. 6.2). There was an additional opening between right and left main bronchus which was inconclusive (Fig. 6.3). Fiberoptic

bronchoscopy showed fistula at lower end of trachea surrounded by granulation tissue just before the main carina. Endobronchial biopsy from granulation tissue showed histology of tuberculosis (Fig. 6.4). He was given antitubercular drugs for 9 months (HRZE for 2 months) with strict glycemic control on insulin therapy. Patient improved clinically and radiologically after 11 weeks of treatment. Mediastinal lymph nodes disappeared at the end of treatment and fistula also healed in the 11 weeks duration (Figs. 6.5 to 6.8). Patient was called for regular follow-up after stopping anti-tubercular drug and was asymptomatic. He was strictly advised for effective control of diabetes

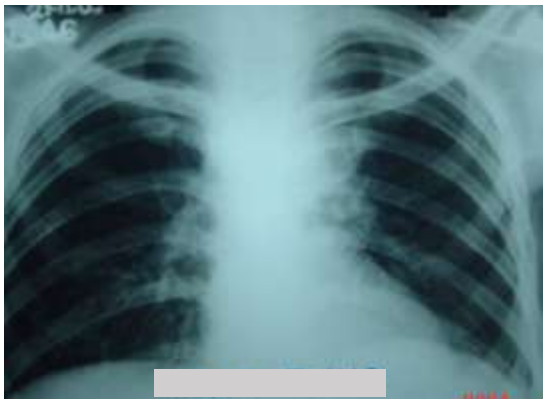


Figure 1:- Apparently normal Chest X-ray.

Figure 2:- Computed tomography of thorax reveals Multiple caseating mediastinal lymphnodes with irregular tracheal outline.

Figure 3:- Computed tomography of thorax showing a Fistulous track along with necrotic lymphnodes in the mediastinal window.

Figure 4:- Bronchoscopic visualization of the Tracheal fistula surrounded by granulation tissue just before the main carina.

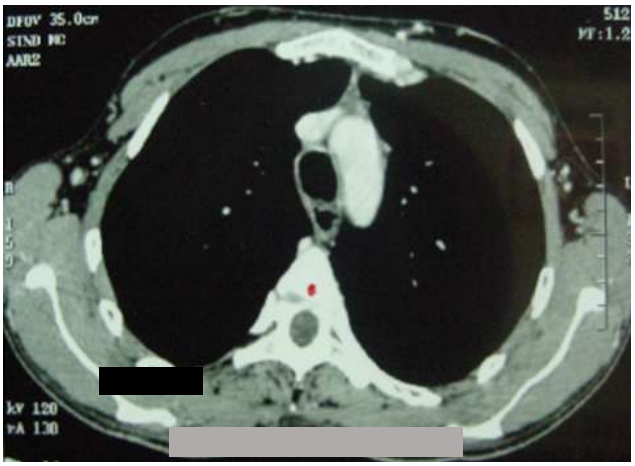


Figure 5:- Shows a normal Chest X-ray after 2 months of Anti-tubercular treatment.

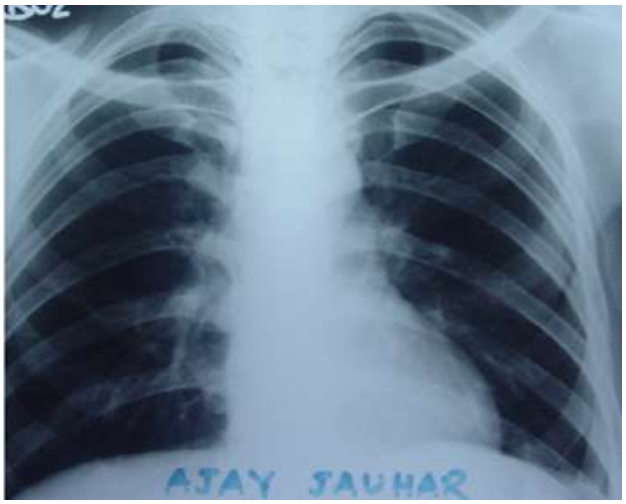


Figure 6:- Computed tomography of chest shows no evidence of mediastinal adenopathy after completion of Anti-tubercular treatment.

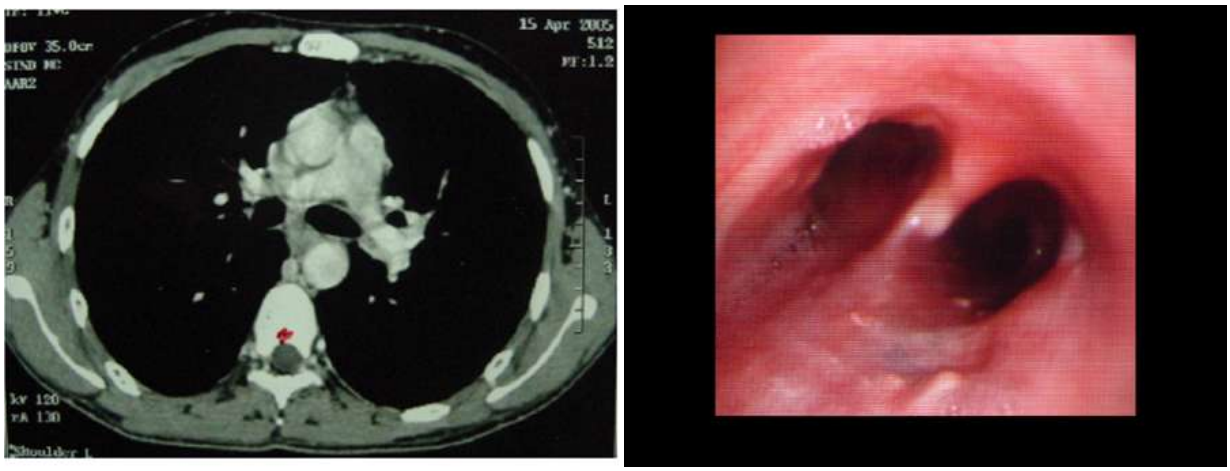


Figure 7:- Computed tomography of chest reveals healing and closure of the fistulous tract after 2 months of Anti-tubercular treatment.

Discussion:-

Endobronchial tuberculosis (EBTB) is defined as a tuberculous infection of the tracheobronchial tree with microbial and histopathological evidence, with or without parenchymal involvement. It was shown that it is more common in young woman than male. Five potential mechanisms were believed to be responsible for the development of endobronchial infections caused by Mycobacterium tuberculosis: (1) direct invasion from an adjacent parenchymal focus; (2) implantation of the organisms from infected sputum; (3) hematogenous spread; (4) erosion of a lymph node inside a bronchus; and (5) lymphatic drainage from the parenchyma toward the peribronchial region. Since bronchoscopy is not routinely performed to all patients with pulmonary tuberculosis, actual incidence of EBTB could not be evaluated. EBTB may mimic diseases such as bronchial asthma, pneumonia, and lung cancer. EBTB may affect any region of the tracheobronchial tree. If it affects the middle lobe, it causes collapse, since the entry ofthe middle lobe is narrow. This is known as middle lobe syndrome. In elderly patients, lobar and segmental bronchial invasion were more common whereas in younger patients involvement of trachea and main bronchi were seen generally and middle lobe syndrome was more common in elderly. Chung classified forms of EBTB into seven subtypes by bronchoscopic finding: Actively caseating, edematous-hyperemic, fibrostenotic, tumorous, granular, ulcerative, and nonspecific bronchitic. [1]

Classical symptoms of EBTB are cough, difficultly expectorated high viscous sputum, wheezing, fever, chest pain, and hemoptysis. Endobronchial tuberculosis is a severe situation with high bacilli load and may cause complications with high morbidity such as bronchial stenosis; early diagnosis and treatment is therefore, mandatory. EBTB contains rather high amounts of tuberculosis bacilli. Unlike parenchymal diseases, acidfast bacilli (AFB) positivity in EBTB is between 16 and 53.3% in most favorable conditions. Radiological findings of EBTB may vary; different findings such as patchy alveolar infiltrations, atelectasis, hilar widening, pleural effusion, mass, and cavitary lesions maybe seen. [2]

Bronchoscopy should be performed in suspicious cases such as unexplained cough, wheezing, dyspnea or hemoptysis. Persistent segmental or lobar collapse, lobar infiltrations, and obstructive pneumonia findings on chest X-ray examination are also indications for bronchoscopy. Sputum or bronchial lavage AFB is generally positive in active caseous type but edematous type is hard to diagnose, and sputum and bronchial lavage AFB is generally negative; therefore, tuberculosis culture and histopathologicalexaminations should be performed. [3,4]

Corticosteroids have been used empirically in the treatment of tuberculosis in an attempt to prevent fibrosis. However, the value of using corticosteroids for EBTB is uncertain. Though literature reporting that steroid addition did not help with improvement or clinical healing there are literature arguing that oral or inhaled steroids effect improvement and clinical healing positively in some types of EBTB. Corticosteroids are likely to be beneficial in earlier stages when hypersensitivity is the predominantmechanism, but are unlikely to be helpful in more advanced cases when extensive fibrosis is present. Close follow-up is advisable as stenosis may develop later despite antituberculosis chemotherapy with or without corticosteroids [5]

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